Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims

~~Claim 1.~~ (Currently amended): A blood treatment device ~~having~~ comprising a blood purification element ~~(1)~~, divided into two chambers by a semipermeable membrane ~~(2)~~, whose first chamber ~~(3)~~ is part of a dialysis fluid loop and whose second chamber ~~(4)~~ is part of an extracorporeal blood loop,

~~having~~ a dialysis fluid supply line for supplying fresh dialysis fluid to the first chamber ~~(3)~~ and/or into the blood loop,

~~having~~ a dialysis fluid removal line for removing used dialysis fluid from the first chamber ~~(3)~~,

~~having~~ a control unit ~~(34)~~ for controlling the blood treatment device,

~~having an analysis unit (33),~~

~~having~~ at least one sensor ~~(27, 28), connected to the analysis unit (33),~~ on at least one of the blood loop or dialysis fluid loop to detect ~~the~~ and measure a concentration of a first material ~~which may penetrate~~ capable of penetrating the semipermeable membrane ~~(2)~~, and

~~the~~ an analysis unit ~~(33) being capable of determining the~~ operatively connected to the at least one sensor to determine i) a

blood purification performance L1 of the blood purification element for the first material ~~on the basis of~~ based on the measurement values of the at least one sensor ~~(27, 28), characterized in that the analysis unit (33) is also capable of determining the~~ and ii) a blood purification performance L2 of the blood purification element for a second material, which is different from the blood purification performance L1 for the first material, ~~on the basis of~~ based on the blood purification performance L1 for the first material.

~~Claim~~ 2. (Currently amended): The blood treatment device according to Claim 1, ~~characterized in that~~ wherein the blood purification performance L is the effective dialysis Deff.

~~Claim~~ 3. (Currently amended): The blood treatment device according to Claim 2, ~~characterized in that~~ wherein the analysis unit ~~(33) is capable of deriving~~ derives an effective mass exchange coefficient k0A1eff from ~~the~~ a measured dialysance D1eff for the first material, ~~of determining the~~ determines an effective mass exchange coefficient k0A2eff for the second material from ~~the~~ a stored ratio f between ~~the~~ a theoretical mass exchange coefficient k0A2th of the second material and ~~the~~ a theoretical mass exchange coefficient k0A1th of the first material by multiplying with k0A1eff, and ~~of~~

~~deriving the~~ derives an effective dialysance D2eff for the second material from k0A2eff.

~~Claim 4.~~ (Currently amended): The blood treatment device according to Claim 2, ~~characterized in that~~ wherein the analysis unit ~~(33) is capable of deriving~~[[,]] derives from ~~the~~ a stored theoretical mass exchange ~~coefficients~~ coefficient k0A1th for the first material and ~~k0A1th~~ a stored theoretical mass exchange coefficient k0A2th for the second material, values corresponding thereto for ~~the~~ theoretical dialysances D1th and D2th, and ~~of determining~~ determines ~~the~~ an effective dialysance D2eff for the second material from ~~the~~ a measured dialysance D1eff for the first material multiplied by ~~the~~ a ratio D2th to D1th.

~~Claim 5.~~ (Currently amended): The blood treatment device according to Claim ~~1, characterized in that~~ wherein the at least one sensor is a first ~~upstream~~ downstream sensor ~~(28)~~ on the dialysis fluid removal line ~~(8a)~~ for measuring the concentration of the first material in the used dialysis fluid.

~~Claim~~ 6. (Currently amended): The blood treatment device according to Claim 5, ~~characterized in that it also includes~~ further comprising a dialysis fluid preparation unit ~~(11), which is~~ connected to the control unit ~~(34)~~.

~~Claim 7.~~ (Currently amended): The blood treatment device according to Claim 6, ~~characterized in that~~ the analysis unit ~~(33)~~ and the control unit ~~(34) are~~ being capable of determining the blood purification performance L1 for the first material ~~through the following~~ by a method comprising[[:]]

~~storage of the~~ storing a concentration C1di1 of the first material in the fresh dialysis fluid in the analysis unit ~~(33)~~,

~~measurement of the~~ measuring a concentration C1do1 of the first material in the used dialysis fluid using the first downstream sensor ~~(28)~~ and ~~storage of~~ storing C1do1 in the analysis unit ~~(33)~~,

~~alteration of the~~ altering a concentration C1di of the first material in the fresh dialysis fluid by the dialysis fluid preparation unit ~~(11)~~ at the command of the control unit ~~(34)~~,

~~storage of the~~ storing a changed concentration C1di2 of the first material in the fresh dialysis fluid in the analysis unit ~~(33)~~,

~~measurement of the~~ measuring a changed concentration C1do2 of the first material in the used dialysis fluid using the first downstream sensor ~~(28)~~ and ~~storage of~~ storing C1do2 in the analysis unit ~~(33)~~, and

~~determination~~ determining by the analysis unit ~~(33) of~~ the blood purification performance L1 on the basis of the concentrations C1di1, C1do1 and changed concentrations C1di2, C1do2 of the first material in the fresh and used dialysis fluid.

~~Claim 8.~~ (Currently amended): The blood treatment device according to Claim 7, ~~characterized in that~~ wherein the dialysis fluid preparation unit ~~(11)~~ performs the change of the concentration C1di in the form of a step or bolus.

~~Claim 9.~~ (Currently amended): The blood treatment device according to Claim 7, ~~characterized in that it also includes~~ further comprising a first upstream sensor ~~(27)~~, connected to the analysis unit ~~(33)~~ and ~~placed~~ located on the dialysis fluid supply line ~~(7b)~~, for measuring the concentrations C1di1 and C1di2 in the fresh dialysis fluid.

~~Claim~~ 10. (Currently amended): The blood treatment device according to Claim 1, ~~characterized in that it also includes~~ further comprising a second downstream sensor ~~(48)~~, connected to the analysis unit ~~(33)~~ and ~~placed~~ located on the dialysis fluid removal line ~~(8a)~~, for measuring the concentration C2do of the second material in the used dialysis fluid.

~~Claim~~ 11. (Currently amended): The blood treatment device according to Claim 10, ~~characterized in that~~ wherein the analysis unit ~~(33) is capable of determining the~~ determines a concentration C2bi of the second material in the blood flowing to the second chamber ~~(4)~~

~~on the basis of~~ based on the measured concentration C2do of the second material in the used dialysis fluid and the stored concentration C2di of the second material in the fresh dialysis fluid and the established blood purification performance L2 of the second material.

~~Claim~~ 12. (Currently amended): The blood treatment device according to Claim 1, ~~characterized in that~~ wherein the first material is sodium.

~~Claim~~ 13. (Currently amended): The blood treatment device according to Claim 1, ~~characterized in that~~ wherein the second material is potassium, glucose, creatinine, calcium, or phosphate.

14. (New) A hemodialysis device comprising:

a blood purification element having a semipermeable membrane, a first chamber connected to a dialysis fluid loop, and a second chamber connected to an extracorporeal blood loop;

a dialysis fluid supply line to supply fresh dialysis fluid to the first chamber and/or into the blood loop;

a dialysis fluid removal line to remove used dialysis fluid from the first chamber;

a control unit to control the hemodialysis device;

a sensor on the dialysis fluid removal line to measure a concentration of a first material in the used dialysis fluid; and

an analysis unit operatively connected to the sensor to determine i) a blood purification performance L1 of the blood purification element for the first material based on the measured concentration, and ii) a blood purification performance L2 of the blood purification element for a second material based on the performance L1 for the first material, the performance L2 being different from the performance L1,

the analysis unit deriving from a stored theoretical mass exchange coefficient k0A1th for the first material and a stored theoretical mass exchange coefficient k0A2th for the second material, values corresponding thereto for theoretical dialysances D1th and D2th, and determining an effective dialysance D2eff for the second material from a measured dialysance D1eff for the first material multiplied by a ratio D2th to D1th.

15. (New) A hemodialysis device comprising:

a blood purification element having a semipermeable membrane, a first chamber connected to a dialysis fluid loop, and a second chamber connected to an extracorporeal blood loop;

a dialysis fluid supply line to supply fresh dialysis fluid to the first chamber and/or into the blood loop;

a dialysis fluid removal line to remove used dialysis fluid from the first chamber;

a control unit to control the hemodialysis device;

a sensor on the dialysis fluid removal line to measure a concentration of a first material in the used dialysis fluid; and

an analysis unit operatively connected to the sensor to determine i) a blood purification performance L1 of the blood purification element for the first material based on the measured concentration, and ii) a blood purification performance L2 of the blood purification element for a second material based on the performance L1 for the first material, the performance L2 being different from the performance L1,

the analysis unit deriving an effective mass exchange coefficient k0A1eff from a measured dialysance D1eff for the first material, determining an effective mass exchange coefficient k0A2eff for the second material from a stored ratio f between a theoretical mass exchange coefficient k0A2th of the second material and a theoretical mass exchange coefficient k0A1th of the first material by multiplying with k0A1eff, and deriving an effective dialysance D2eff for the second material from k0A2eff.

16. (New) The hemodialysis device according to claim 15, wherein the sensor detects an electrical conductivity of the first material in the used dialysis fluid.

17. (New) The hemodialysis device according to claim 15, further comprising a second sensor on the dialysis fluid removal line to measure a concentration of the second material in the used dialysis fluid.